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ADDITIONS TO AND SUBTRACTIONS FROM THE FLORA OF VIRGINIA

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(Plates 1056–1085)

PART I. THREE SHORT TRIPS TO SOUTHEASTERN VIRGINIA

As soon as gasoline became available in 1945 Mr. Bayard Long and I returned to our center at Waverly, Virginia, anxious to do some autumnal exploring of the ponds of Sussex and Southampton Counties which we had seen together only in the early summer of 1943 and then at the last moments of a trip which had to be our last one for more than two years. Many species, accredited to southeastern Virginia for a century to a century and a half but without known vouchers, were on our minds; and we were determined, now that we had found some ponds with broad sandy or peaty beaches and extensive swales (only a few miles from the Southampton headquarters of Frederick Pursh, at Dr. Edwin Gray's near Sebrell), to gather them where presumably Pursh had found them, for some, though not all, of the unverified records started with Pursh in 1814, a few going farther back and a few starting with Torrey & Gray or with early editions of Gray's Manual. We had for years hunted in vain in moist pine-barrens or damp peaty or sandy pockets for *Bartonia verna*¹, which Pursh had recorded from "mossy swamps: Virginia to Georgia";

¹ As in preceding papers of this Virginia series, authors of names which are in Gray's Manual, ed. 7, are omitted.

and records of other plants of sands or sandy barrens, like *Syn-gonanthus flavidulus* and *Kalmia hirsuta*, still haunted us. These, however, were spring- or early summer-flowering species. We had now set our hearts on at last retrieving from the peaty pond-margins such obvious desiderata as *Mayaca Aubleti* and *Balduina uniflora*, the latter described by Nuttall in 1818 from "open grassy swamps from the maritime parts of Virginia to Florida". The *Balduina*, of course, might be back in the savanna-like swales which at least one member of the party had hopefully visualized as there, if anywhere, associated with other Virginian "spooks" like *Dichromena latifolia*, *Juncus polycephalus*, *Oxypolis filiformis* and *Baccharis glomeruliflora*. And we hoped at last to find Pursh's own station (supported by a specimen at the Philadelphia Academy) for *Litsea*, to say nothing of the always evasive but magnificent evergreen tree, *Gordonia*. These and other reputed Virginians were on our minds, as they had been for several years, and, now that we actually knew of appropriate pond-margins near where Pursh had resided, we were buoyant with hope.

But, alas, excessive rains of late summer had flooded the ponds; the shores of most of them were completely drowned. Only a very narrow and soaking-wet margin of a few feet (instead of 50-100 or more) showed, where the water had receded at Airfield Pond. Following the northeastern margin, which we had slightly explored in early July of 1943, we found nothing new. The bushy swale at the head of the first cove was a typical *Cephalanthus*-swamp, with herbaceous vegetation of the commonest and most aggressive species, such as *Rhynchospora glomerata* or *Xyris caroliniana* and *X. ambigua* Beyrich. If any rarity ever occurred there it would have been crowded out by *Cephalanthus* and its jostling associates. So, going to the southern shore of the pond, we climbed over the inevitable fenced-in hog-wallow, to follow the little belt of exposed shore. Immediately the excitement began. Standing up out of the continuous carpet of *Drosera capillaris* Poir. we promptly saw the beautifully distinct but relatively common *Gentiana Catesbaei* Walt. (see PLATES 1078 and 1079). Growing with it was the white (when dry saffron)-flowered *Sabatia difformis* (L.) Druce, a characteristic species new to Virginia. In 1943, on the northeastern shore of

Airfield we had found only a single small colony of *Rhynchospora filifolia* Torr. at the first station between southeastern North Carolina and those famous havens of isolated southern plants, Sussex County, Delaware, and Cape May, New Jersey. Here, on the southern shore, it was dominant. Associated with it was *Eriocaulon decangulare*, a very local species in Virginia but here abundant; and *Hypericum*, § *Brathys* threw us into despair. Almost everywhere was typical *H. canadense* of all sizes up to 6 dm. high, while more or less alternating and broader-leaved plants with few or aborted fruits, the plants reaching a height of 7.5 dm., abounded. Although broader-leaved, this could not be the northern *H. majus*. It goes into the heteromorphic series called *H. dissimulatum* Bicknell (surely well named), that half-sterile bunch which northward seems like polymorphous progeny of *H. canadense* crossed with either *H. boreale* or *H. mutilum*. Here *H. boreale* was out of the question and, although *H. mutilum* is in the neighborhood, we did not specially note it at Airfield Pond. The plant there which most interested us, however, was a tiny little leaning or half-reclining *Hypericum* with short-petioled obovate to oblanceolate leaves, a slender plant which an hour or so earlier we had been puzzling over in a pocket of deep *Sphagnum* a little farther north. This weak and slender plant, strongly suggesting attenuated *Galium trifidum* or *G. tinctorium*, occupied a few mossy carpets quite by itself. It is later described, and illustrated in PLATE 1076.

Near the mossy and peaty pockets of the new *Hypericum* was *Scleria Muhlenbergii* Steud.¹, a nice species but a bit disappointing, for we hoped, in this habitat, so like many pond-shores of the Carolinas, southern New Jersey, Long Island and southeastern Massachusetts, to get its close relative, *S. reticularis*, which occurs from Florida to southeastern South Carolina, thence seeming to "jump" to Delaware but occurring rather generally from there to eastern Massachusetts. We hunted for other species which occur in Georgia or South or North Carolina but are unknown between there and Delaware or southern New Jersey, but mostly in vain. In a few mossy pockets, however, one of them suddenly appeared, *Psilocarya nitens*, a very neat species, heretofore unknown from between the famous Wilmington region of south-

¹ See Fernald in RHODORA, xlv. 296, 297 (1943).

eastern North Carolina and Cape May, New Jersey but local about ponds of Long Island, with an isolated northeastern outlier on a single pond in Plymouth, Massachusetts, and, like several other Coastal Plain species, an isolated colony in northwestern Indiana. That was the sort of plant we were looking for but we were unprepared for the next discovery. Very near the *Psilocarya*, in semi-open peaty and sandy spots, there was a tiny *Xyris*, making little whitish-green tufts only 2 or 3 cm. across. Its filiform scapes suggested *X. Curtissii* Malme, but instead of being a cespitose blue-green perennial with many scapes, as is the latter species, the little plant of Airfield Pond was an annual, with mostly solitary scapes and different sepals and seeds. It proves to be the most northern member of the chiefly tropical *Xyris*, § *Brevifoliae*. I have already described and illustrated *X. Bayardi* in RHODORA, xlviii. 56, plate 1007 (1946). The insignificant belt of sand and peat exposed at the margin of Airfield Pond was really very significant and had well justified our faith in the locality, but *Mayaca*, *Balduina*, *Dichromena latifolia*, *Oxypolis filiformis* and the other reputed Virginians still remained on the doubtful list. For a moment I thought I saw *Mayaca* but only for a moment. The wet peat was carpeted right down to the water with very loosely leafy and prolonged, flexuous, creeping and writhing stems of the most diffuse extreme of *Lycopodium inundatum*, var. *Bigelovii* Tuckerm.¹ These sterile and lax strands up to 4 dm. long and with leaves up to 1 cm. long so closely resemble the long creeping stems of *Mayaca fluviatilis* Aublet, which comes north into southeastern North Carolina, that, at a distance of a few feet, herbarium sheets of the two are indistinguishable. As I suggest in Part II, it is a temptation to imagine that Pursh's record of *Mayaca* from Virginia could easily have been based on such loose-growing sterile plants of the *Lycopodium*.

More rain quickly drowned the temporary narrow beach of Airfield, and every pond we visited was quite without exposed shore. So we soon started out on days of mere exploration, making our way to several ponds, that we might sometime, when the water is low, know which to revisit. There are a full one hundred of them on the Coastal Plain of southeastern Virginia

¹ See RHODORA, xlviii. 136 (1946).

and it was important to learn how to reach them. One which lies to the north of Airfield Pond, but which is at the head of a branch flowing into Brittle's, seemed worth finding. When we showed the contour-sheet to some colored boys they said: "Oh, that's Jenkins Pond." Driving along the road we were puzzled as to which farm-road to take; so, seeing a farmer at work, we asked how to reach Jenkins Pond, receiving the prompt reply: "Never heard of it. There's a pond back of my barn which might interest you. Just drive up to the house and leave your car. My name is Jenkins." We have called this promising pond "Jenkins Pond." We remembered a tempting piece of *Sphagnum*-carpeted woods not far from Brittle's Pond where, in July of 1943, we had seen interesting plants. At this season the most interesting discovery was the *Galium*-like *Hypericum* already discussed; and, since such spring-fed sphagnous woods often contain the primitive and rare *Carex Collinsii* Nutt., we watched for it, although June would have been the proper season. There it was, mixed with the long misinterpreted *Agrostis altissima* (Walt.) Tuckerm., which I shall discuss in Part II. At the margin of these woods we established a new eastern limit for *Lobelia georgiana* McVaugh (*L. glandulifera* (Gray) Small). Nearby, the drier woods yielded a very handsome and quite distinctive *Desmodium*, one of Dr. Schubert's species, the name not yet published by her. A mile or so north of Waverly, along a wood-road near a now drained pond, we were delighted to find a good colony of the recently described *Eupatorium cordigerum* Fern. in RHODORA, xlvii. 192, plate 908 (1945); and near it was a great clump of a puzzling *Solidago*. This has been described and illustrated as \times *S. hirtipes* Fern. in RHODORA, xlviii. 65, plate 1011 (1946).

The ponds being over-full and their shores inaccessible, the obvious thing to do was to explore the fresh reed-marshes along the tidal rivers. Fortunately our friend Calvin Horne had his outboard-motor still mounted on a trailer after a vacation on the lower James; so with him or his substitute we returned to the usually productive reed-marshes of the lower Northwest River in southern Norfolk County and similar marshes of Blackwater Creek in southern Princess Anne County. These very extensive reed-marshes, with coarse grasses, sedges, *Typha*, and tall *Com-*

positae high above one's head, these interspersed with the incomparably tough and stabbing "Blaspheme-vine", *Smilax laurifolia*, or with tall masses of Sawgrass, *Cladium jamaicense*, with its hard and elongate leaves fringed by coarse saw-teeth, are not the places for picnics or for the mere seeker for pretty flowers. Finding a possible landing-spot, one wallows and tumbles into the back of the marsh through almost impassible barriers and when nearly exhausted makes his way back to the boat. Three or four such landings in a day were all we two oldish but somewhat experienced botanists could stand. In view of the facts that almost every landing (perhaps a fourth of a mile apart) often yields something else and that about a quarter of Princess Anne County consists of such marshes (with Norfolk County a good second) the future work for a new generation is impressive. At one point or another these fresh marshes or their borders and pools are occupied by such local species, then known from only one station in Virginia, as *Phalaris caroliniana* Walt., *Scirpus etuberculatus*, *Eleocharis radicans* (Poir.) Kunth, *Lilaeopsis carolinensis* C. & R., *Pluchea purpurascens* (Sw.) DC., *Aster Elliottii* T. & G., etc., etc.; while only 2 or 3 stations are known for many others: *Juncus megacephalus*, *Dichromena colorata*, *Ludwigia alata*, *Verbena scabra* Vahl, etc., etc. So we attempted to do our bit, but these two areas, not far from the bridges, had been well searched before, Northwest an old collecting-ground of Heller, Kearney and ourselves, and Blackwater Bridge much visited also. *Ludwigia alata* was added to the specialities of Northwest and the almost smooth estuarine *Polygonum sagittatum* var. *gracilentum* Fern., mingling with true plump-fruited *P. arifolium*, which seems to specialize on estuaries, was extended south from the marshes of the Chickahominy. *Aster Elliottii* was found to be rather general on the marshes; and at the type-locality, Northwest, of *Lobelia elongata* Small we found some overgrown plants with branching inflorescences. But we soon became absorbed with *Spartina cynosuroides*, for it suddenly struck us that the loosely racemose inflorescences with definitely peduncled spikes, which abounded in these marshes, belonged to a very different plant from the one on real salt-marsh, in which the inflorescence is denser and with many more closely crowded and appressed spikes. We resolved to get real rhizomes and stolons,

for most herbaria lack them. If others have attempted that feat they will know that it may take an hour of hard pickaxing to extract complete rhizomes and stolons from the dense and slimy substratum. After one was secured for me there must be one for Long; then a few duplicates! This plant of fresh to merely brackish tidal marshes was again dug on similar reed-marshes of Gray's Creek, well up the James above salt water. This subject will be further analyzed in Part II.

In June of 1946 Long, unfortunately, was unable to join Dr. H. Emery Moore, Jr., and me for a trip, June 3–15, but perhaps he was really fortunate in avoiding possible infection. When we left Cambridge Moore was feeling "miserable" and, as we proceeded, it was evident that he was urging himself to drive; eventually weakened and nearly prostrated by intestinal 'flu. Nevertheless, he hung on gamely until the doctor interfered, ordered him to bed and prescribed a starvation-diet. Naturally the first duty was to get at the ponds. It had rained heavily through May and we were told that the pond-shores were flooded. Consequently, when we first spied Airfield, I thought we had taken the wrong road. There wasn't any pond there, merely a great shallow and peaty basin more than a mile long, with scattered small pools. But it was Airfield, after the breaking of the dam in winter. The bottom, as far out as we cared to walk, was a solid turf of the usually perennial *Eleocharis obtusa*, var. *ellipsoidalis* Fern. in fruit, a perennial which had sprung up and was heavily fruiting in a few months! The usual array of *Rhynchospora*, *Carex*, *Panicum* and other shore-plants luxuriated, but the upper margin of the pond showed nothing new. The dam of Whitefield Pond, southwest of Corinth Church, had, unhappily for us, stayed damnably intact and the heavy rains had been thoroughly impounded, so that botanizing became deep wading (up to our waists). Immediately we were challenged by the great variation in the fruit of the Water-Ash, *Fraxinus caroliniana*. Some shrubs had the fruit purplish, others pale or yellowish, some had the young shoots and the lower leaf-surfaces glabrous, others softly velvety or pilose; but those variations were merely formal. More significant was the shape of the fruit, rhombic, ellipsoid or oblanceolate, broadly rounded at summit or attenuate, flat, spoon-shaped or 3-angled. From that first day

throughout the trip this baffling series held our attention. Whether it will be sufficiently studied for further consideration in this paper is doubtful, since it is necessary to get further data on some old types within the genus. Very soon we got into a great clump of high-doming blackberry, gigantic shrubs with only a few prickles but with intricately forking and flexible branchlets 2 m. long and arching over to the ground. This was a stranger which will be described and illustrated (PLATES 1067-1069) in Part II; but it merely started us on the inevitable series of novel *Rubi*. At one point *Itea virginica* did not look natural. In fact, I thought we had extended northward the range of *Fothergilla parvifolia* Kearney, the little compact inflorescences were so strikingly suggestive of *Fothergilla*. The clump is, however, the type of *Itea virginica*, forma *abbreviata* Fern. in RHODORA, xlv. 22 (1947). Only at one point, close to the dam, was there evident a bit of exposed beach; but that was definitely worth while, for there, tangled with the now very familiar but locally endemic *Eryngium prostratum*, var. *disjunctum* Fern. in RHODORA, xlvii. 163, plates 897 and 898 (1945), was a neat little colony of *Ludwigia brevipes* (Long) Eames, a species we had known only from damp sands nearer the outer coast, the most inland station known having been at the Cat Ponds in eastern Isle of Wight County. These few specialities, added to *Polygonum hydropiperoides*, var. *euronotorum* Fern. in RHODORA, l. c. 137, plate 884 (1945), all on a few rods of shore, certainly mean that some dry summer Whitefield Pond is going to give us some more surprises.

Having an errand which required driving to Petersburg, we started northwestward from Waverly, but when we reached the very wet (then almost pond-like) depression in the pinelands only 3 or 4 miles from Waverly we stopped to get any lingering flowers of *Iris prismatica* which abounds there. While we were gathering these last flowering specimens I was impressed by the trailing dewberry which occupied the wet hollow. This was not the right habitat for ordinary xerophytic and glabrous-leaved *Rubus flagellaris*, and examination showed that this swamp-plant had the leaves soft-pubescent beneath. It was, obviously, not that species. Subsequently, in September, Long and I got supplementary material and then found it occupying a similar wet and swaley habitat several miles away. Differing from *R. flagellaris*

in several additional characters, this trailer of wet pineland will be described in Part II and shown in PLATES 1064–1066. In this boggy hollow, the home of *Aletris aurea*, *Tofieldia racemosa*, *Zigadenus glaberrimus* and *Carex Barrattii* Schwein. & Torr., the low and narrow-leaved *Viburnum nudum*, var. *angustifolium* Torr. & Gray was abundant in its almost extreme development, flowering but only 3 or 4 feet high, although later on we found it fully mature and only 1½ feet high.

At New Bohemia we varied the route by leaving the 4-lane turnpike and taking a cross-road toward the Jerusalem Plank Road, in order to pass through unspoiled woodland and clearings; but we got only a short distance when we halted for an abundant goldenrod, in full bloom in the first week of June (obviously having begun flowering late in May). Immediately thinking of *Solidago verna* M. A. Curtis, which flowers in southeastern North Carolina from earliest May to early June, we set to work on the large colony. It obviously was not *S. verna* but was so like the midsummer and autumnal *S. juncea* of northern, inland, and (southward) upland range as to baffle us. It proves to be a vernal-flowering Coastal Plain extreme of *S. juncea*, differing from it in smaller involucre with vividly green (instead of yellowish) phyllaries and shorter ligules, disk-corollas, pappus and achenes. This fine new goldenrod, to be described in Part II, ended the morning's collecting. Later in the day, trailing old specialties, we brought up at the little sphagnous bog near Dahlia, the home of so many rarities. For purely sentimental reasons I make it a point to look in there occasionally, although we now find nothing new. In fact, the encroachment by the farmer, whose plowed acreage, ditching and hogs continue to invade the bog, is bound to destroy some of the specialities. Not so one of them, which a few years ago was represented by only a few small plants. Repeated and chronically southern burning off of the bog has stimulated *Zigadenus densus* (Desr.) Fern. at its only known Virginia station, so that the greatly increased colony now bears inflorescences four times the recorded size, some of them branching and paniculate, instead of simply racemose!

While stationed at Norfolk during the war, Mr. Leslie Hubricht of Detroit had written me of some of his botanical finds and on returning to Detroit he sent me specifications of the three

most natural and undisturbed spots he had found in his occasional botanizing trips. These were all near Suffolk. One of them had been familiar to Long and me, the type-region of *Malaxis Bayardi* Fern. in RHODORA, xxxviii. 402, fig. 1 and pl. 446, figs. 1 and 2 (1936); the others were unknown to us. So one day Moore and I started out to look into them. The first, a tiny bit of sphagnous bog west of Kilby, along the Norfolk and Western Railway, was quickly found, recognized from the path on the railroad-embankment by the upstanding yellowish trumpets of *Sarracenia flava*, always a good indicator. In early June such bogs are only beginning to show their real treasures but even then the richness of the spot in localized plants was apparent. *Scleria minor* (Britt.) Stone, a denizen of sphagnous bogs, was there, again a good indicator, and the thick corm-like bases and foliage nearby indicated *Aster gracilis*. Here, too, was *Scutellaria integrifolia*, var. *hispida* Benth., at its third known station so far north. Best of all, at the western border of the bog we walked into the second Virginian station for the very rare southern *Sisyrinchium capillare* Bicknell, already in mature and opening fruit. These were only mild suggestions of what the September visit would yield.

The borders of the Great Dismal Swamp, traversed by trunk-roads, always yield surprises. So, passing Suffolk, en route to the tidal marshes of Northwest River, we had passed Magnolia when, curious about the very large *Anthoxanthum odoratum* (up to 1 m. high and with interrupted inflorescences nearly 1.5 dm. long), which deliciously scented the roadside atmosphere, I got out to investigate. The grass was interesting enough, forma *giganteum* P. Junge, which I had never seen. But, before returning to the car, I became puzzled by the water-lily which filled the seemingly shallow but, when entered, pretty deep peat-bottomed pools. The flowers were all wrong; standing erect some inches above the floating leaves, both sepals and petals narrowly lance-attenuate, the sepals reflexed and pointing down to the water. This was quite new to our experience, so Moore, although feeling pretty groggy, wanted to take a kodachrome-picture of it with the old man as a scale. In labeling this photograph he displayed his emotions at the time, for he called it "Water-nymphs in the G. D. Swamp" (PLATE 1061). The plant is so distinct that it will be described and illustrated (PLATES 1061-1063) in Part II.

Not far from Magnolia there was a trailing *Rubus* which I had never met, merely *R. celer* Bailey, its range extended southward from Arlington and Fairfax Counties. But the next two *Rubi* represented not merely range-extensions. In the very wet and perpetually inundated margin of the Great Dismal Swamp, near Wallaceton, there was a strange relative of *R. cuneifolius*, which is xerophytic. This shrub, in the wettest of habitats, looked unfamiliar. It proves to be a novelty, described and figured (PLATES 1070 and 1071) in Part II, its nearest ally apparently being *R. Humei* Bailey of Florida, said by its author to be "the only paludose species" of the section. Desiring to get really good rhizomes of *Dryopteris celsa*, which had been much on my mind since I suddenly found myself condemned to "do" the ferns for the Manual, we proceeded to the cypress-swamp along Northwest River northeast of Wallaceton to get them. There, in the shade of *Taxodium*, another and very "different" *Rubus* blocked our path. So definitely not of the ordinary run and occupying so distinctive a habitat, it had to be collected. In September, when Clement was with Long and me, we found it characteristic of other cypress-swamps up to 50 miles away. It has a real range and definite habitat; so I am forced to describe and illustrate it (PLATES 1072-1074) in Part II. The reed-marshes at Northwest and at Blackwater failed to yield any real novelties, though at Northwest the marsh had *Carex Mitchelliana* M. A. Curtis of fresh habitats mingling its roots with those of the usually extreme halophyte, *Scirpus Olneyi*! Southeast of Blackwater, at Pellitory Point along Back Bay, almost in North Carolina, *Carex hormathodes* abounded, its previous southern limit in the tidal marshes of the James. It may now be looked for on Currituck Sound in North Carolina.

In September of 1946 (5th to 18th) my student, Ian D. Clement, drove Long and me to Virginia, our new headquarters being in a very comfortable cabin at the Virginia Diner in Wakefield. Airfield Pond had pretty well filled after the repairing of its dam and we got nothing not seen the year before, although several species, *Sabatia difformis* and some others, were more abundant, while the draining of the pond seemed to have put a temporary check upon others. Whitefield Pond was still overflowing but we got better material of some of the June specialities

at the only bit of beach exposed, and began the collecting of *Eleocharis vivipara* Link, a southern species heretofore known in the state only from near Cape Henry but from our first day to the last now repeatedly appearing about the ponds from Southampton to Princess Anne.

One of the localities indicated to us by Mr. Hubricht as almost unique in southeastern Virginia, in being rich woods with the deep carpet of leafmold undisturbed (instead of scraped down to the underlying clay or sand for use on the truck-farms) was near a most unpromising tangle of railroads, sidings, abandoned roads and dumps just to the east of Suffolk. We looked askance at the abandoned dirt-road he indicated on his map but, after trying others, came back to it and in one minute were at the margin of a fine piece of oak-hickory woods, bordered on one side by a dump of broken glass and rubbish, on another by an old field, on a third by a railroad. Starting in at the upper edge of the woods we promptly came to a small branch bordered by the rare *Chelone obliqua*; then the largest colony we had ever imagined, mostly in fruit, of *Hexalectris*, which always means good soil; then *Sanicula Smallii* Bicknell at a new eastern limit. With them were other good things but we were most interested in a strange *Desmodium*, one we did not remember having seen and which Dr. Schubert (at the moment of this writing studying and photographing at Geneva the types of the *Desmodia* described in De Candolle's Prodrumus) assures us is undescribed. Trying to get rooting specimens, we followed the horizontal roots by cutting away hickory- and oak-roots and eventually landed complete roots. The fruiting stem arose from a sweet-potato-like enlargement which terminated a long filiform root, fringed with tubercle-bearing rootlets, and itself terminated by a slender "sweet-potato". We had started something! Coming up from the woods to a fallen log we quickly disposed of lunch and then rested for an hour or two by digging out root-systems of *Desmodium viridiflorum*, *paniculatum* and *nudiflorum*, each very distinctive. The die was cast; there was no turning back. Every species of *Desmodium* we came to after that must be dug. *D. lineatum* of dry pineland had a stout tap-root descending vertically through a mesh of oak- and pine-roots, so that it was necessary to cut out a broad pit a foot and a half deep and even then to miss the tip.

Then a second one must be dug, that both Long and I might each have one. *D. pauciflorum* of rich woodland loam has filiform, horizontal roots ending in tubers resembling small peanuts. In fact, if one really wants to distinguish the species of *Desmodium* he should know the roots! One plant can be dug, on the average, in half-an-hour to an hour. I am not making a key to the species wholly dependent on the roots. There are many which we do not yet know. It is going to be interesting, for instance, to see what sphagnicolous *D. tenuifolium* T. & G. has for roots. Dr. Schubert, furthermore, is in the midst of a monograph of the genus in North America. She has been working with bracts, calyx, articles (segments of loment), leaves and such superficial characters. We are merely trying to do our little part by helping her get at the root of her problem!

Clement, absorbed in the intricacies of *Sida*, was anxious to see the type-colony of *S. inflexa* Fern. in RHODORA, xlii. 463, pl. 638 and 639, figs. 1-3 (1940). In his studies he has been able to show me that I had mixed two species and that *S. inflexa* is indeed an endemic species of southeastern Virginia only. The type-region is the woods along Three Creek, perhaps 2 miles above Carey Bridge over the Nottoway. The banks and very rich woods along the western side of the Nottoway there have been very productive. There has been the only actually known station for the rare and evasive true *Sphenopholis pallens*, discussed in RHODORA, l. c. 356 and 357 and again in vol. xliii. 494 and 534 (1941); and growing near it was the relatively rare *Aconitum uncinatum*, var. *acutidens* Fern. in RHODORA, xliv. 398, pl. 720, figs. 2-4 (1942). Nearby grow *Tetragonotheca helianthoides* and true southern *Polygala polygama* at one of the two known stations in Virginia, as well as numerous other rarities. As soon as we turned into the wood-road above Carey Bridge we were disheartened. The country thereabouts was being improved! Everywhere the woods were torn up and heavy bulldozers and other instruments of so-called improvement had dug away or heaped in great mounds the whole substratum nearly up to the crossing of Three Creek. The only station for *Sphenopholis pallens* was covered by many feet of earth and the preparation for a new approach to a presumably new bridge had obliterated the *Aconitum* and many more mere plants. Who cares? Fearing that *Tetragonotheca*,

the *Sida* and their local associates were also gone, we were relieved to find that these, at least, were still spared, but we do not know what may have been happening since. *Sida inflexa* was in fine form, much better than we had heretofore known it. We were thankful for that little bit.

At last (on the 8th) we got to the little bog about half-a-mile west of Kilby. Immediately the shouting began. While I was collecting one speciality or showing it to Clement, Long was calling to me to come and see what he had found. In fact, this small pocket was a regular *rhynchosporicetum*, with half the species of Virginia jostling one another, all the common species and some less common, like *R. debilis* Gale in RHODORA, xlv. 194, pl. 826, figs. 5A and 5B (1944), *R. rariflora* (Michx.) Ell., and *R. chalarocephala* Fern. & Gale in RHODORA, xlii. 426, figs. 1 and 2 (1940); and here I began to be worried by *R. perplexa* Britton, for the spikelets were so much more crowded and so much larger than in the Florida type. From now on we collected it and in Part III shall discuss and illustrate it (PLATE 1060). The great show, however, was not from *Rhynchospora*. All over the bog the roseate inflorescences were abundantly supplied by the stiff spikes of *Liatris spicata*, var. *resinosa* (Nutt.) Gaiser in RHODORA, xlviii. 216 (1946), described by Nuttall from "the Pine forests of North and South Carolina", its viscid, dark purple involucres strongly contrasting with the rose-pink flowers; and the broad corymbs of *Carphephorus tomentosus* (Michx.) Torr., var. *Walteri* (Ell.) Fern. in RHODORA, xlii. 481 (1940), which had been known in Virginia only in dry pine-barrens farther inland. Earlier in the morning the rose-color would have been increased by the petals of *Rhexia mariana*, var. *purpurea* Michx. (*R. Nashii* Small) and *R. ciliosa*, both of which drop their petals too promptly for any but very early risers. Yellow was supplied by the panicles of the southern (Texas to Georgia, north to southeastern Virginia) *Solidago nemoralis*, var. *Haleana* Fern., l. c. xxxviii. 227, pl. 431, figs. 1 and 2 (1936) and by a perfectly glabrous extreme, such as we had previously found on the bog near Tom Hunter's at the southwest corner of the county, of the usually densely pilose- or villous-stemmed *S. fistulosa* (*S. pilosa* Walt., *S. villosa* Ell.), an extreme to be more formally defined in Part II. More brilliantly yellowing the upper border of the bog were the earliest expanding

heads of *Coreopsis oniscicarpa* Fern. in RHODORA xl. 472, pl. 533 and 534 (1938). Mingled with these but making less display were such nice plants of bogs or wet pine-barrens of the South as *Ctenium aromaticum*, true *Xyris flexuosa* (*arenicola* Small), *Aletris aurea*, *Paspalum praecox* Walt., var. *Curtisianum* (Steud.) Vasey, *Hypoxis micrantha* Pollard, *Desmodium tenuifolium*, *Hypericum setosum* L., *Ludwigia hirtella* and *pilosa* Walt., and *Gentiana Porphyrio* (in bud). Such a congregation of the elect certainly indicated what must have been the boggy spots when Banister or Clayton first knew southeastern Virginia, these tiny remnants of unaltered country now excessively rare. But that was not all; the good things enumerated are merely the background of the picture. Crawling on hands and knees we began to unravel the tangle; a strange little grass, suggesting *Paspalum setaceum* but with essentially glabrous foliage, to be described and illustrated in Part II (PLATE 1057); an overripe but strange *Ludwigia* which could only be the southern *L. virgata* Michx., the first known in Virginia; a *Crotalaria* quite new to us and growing in *Sphagnum*, not in dry sand, a novelty to be described later and illustrated in PLATE 1075; and almost mixed with it an utterly strange *Panicum* with sheaths and leaves gummy with black wart-like atoms, an apparently new species (PLATE 1059). When we quit near twilight we were not at all certain that we had crawled over and thoroughly investigated every square yard of the bog, but we were temporarily satisfied and, after reporting general results to our friendly hosts at Wakefield, were regularly asked at the end of each day if we had "hit the jack-pot" again.

We certainly did not again approach that day's record but another day, when we had gone hopefully to points farther north, to be somewhat disappointed, we returned to the area. On the northern side of the railroad there was a smaller piece of the bog which we had barely touched, and, reasoning that other such spots might be farther west along the unspoiled right-of-way, we tried out our theory. Less than a mile farther west there was, indeed, a small duplicate of the first bog, with many of the same specialties and with *Lachnocaulon anceps* so atypical in aspect as to raise our hopes. Best of all, here was a dwarf *Scutellaria* which proves to be *S. integrifolia*, var. *multiglandulosa* Kearney (*S. multiglandulosa* Epling), the first from north of Georgia. In the

smaller portion of the first bog some of the now familiar species had greatly developed their inflorescences in only four days and there *Lyonia ligustrina* was reduced to its lowest stature, fruiting and evidently fully developed though only 1.5–2 dm. high (see PLATE 1077). Other surprises of this and near-by areas may be held over for Part II for they would seem trivial after a boggy area which had yielded 6 plants new to science, with 2 others new to Virginia and 17 others which had been known from only 1–3 stations.

Reasoning that the various shallow and fresh ponds back of or among the dunes along the coast would have available shores at low tide and remembering many specialties of such habitats found during our earliest Virginian work, when we had a center at Virginia Beach, we decided to try them. Proceeding to Little Creek in northwestern Princess Anne, we found much of the area under military or naval restrictions; so, since all ponds were, for the moment, alike to us, we bypassed, without seeing it, Bradford Lake, a full mile long, and headed for Lake Joyce, even longer and situated south and east of Chesapeake Beach. But, driving out from the turnpike, we promptly came to a tiny nameless pond less than a quarter of a mile long and went to work. It was well on in the afternoon when we stopped to eat lunch and approaching twilight when we quit. Big Lake Joyce and Bradford Lake and smaller Chub Lake with its half-mile of bordering marshy flat, all easily accessible from Chesapeake Beach, are still unknown to us. The little pond was bordered by a turf of *Eleocharis*, *Juncus*, *Cladium mariscoides* and other such plants. *Eleocharis olivacea* and the now very familiar *E. vivipara* alternated or commingled, and growing by itself there was another, the tropical American *E. flavescens* (Poir.) Urban, heretofore known in the Manual-range only from Virginia Beach and at Cape May, New Jersey. We trampled on the continuous carpets of the usually very local *Ludwigia brevipes* as if it were a mere carpet-weed; but, kneeling down to collect some good strands of it, we stopped abruptly. The *Hypericum* was surely the northern *H. boreale*, heretofore unknown so far south except in the mountains. And the *Galium*, closely resembling *G. tinctorium* (*Claytoni*) puzzled us on account of its large fruit and very long pedicels, merely *G. tinctorium*, var. *floridanum* Wiegand, its range extended north from Florida and here mingling with *Hypericum*

boreale at its southern limit. That was pretty good, but we must look over the dune-hollows. Of course the regular plants were there: *Triplasis purpurea* more than a meter high; *Oenothera humifusa*, *Galium hispidulum*, *Lechea maritima*, var. *virginica* Hodgdon in RHODORA, xl. 109, pl. 490, fig. 9 (1938), *Diodia teres*, var. *hystericina* Fern. & Griscom in RHODORA, xxxix. 307, pl. 469, fig. 4 (1937). Here also was *Cassia nictitans*, var. *hebecarpa* Fern. l. c. xxxviii. 423, pl. 448, figs. 1-3 (1936), heretofore known in Virginia only from the sands of Northampton County. But we were especially pleased with the *Eupatorium* which abounded in the hollows. Off-hand one might pass it for *E. leucolepis* but its very thick and thumb-like tuberous roots are all wrong for the latter species. It proves to be the southeastern *E. recurvans* Small, which we had previously seen only about the Great Dismal Swamp. Starting toward Wakefield at the end of a full day, we were driving as rapidly as allowed on the broad turnpike when Long, famous for such last-moment stunts, shouted "Stop". There, in a cultivated field, was a dominating and very tall weed strange to us. It proves to be the oriental *Echinochloa stagnina* (Retz.) Beauv., apparently not previously known as naturalized in America.

Just one more locality may here be noted. Early in the summer of 1937 Long and I had found very interesting and localized plants on the sandy and peaty beach of Darden's (or Predler's) Pond, north of Courtland, but we had never been there since. We wanted to see what the autumn would show. The shore which we had formerly explored proved to have been thoroughly punched by hoofs, so, climbing across the dam, which we were sure the hogs could not do, we came to an unspoiled sand-bordered beach full of local plants. Until mid-afternoon, when empty stomachs urged us back to the car, we were studying and collecting the usual intricate series in *Eleocharis* and other technical groups, but we did not have to puzzle over the very definite *E. tricostata* at the third Virginian station, nor *Scutellaria integrifolia*, var. *multiglandulosa*, which we had been getting on the bog near Kilby. *Juncus canadensis*, var. *euroauster* Fern. in RHODORA, xlvii. 127, pl. 881, figs. 1-3 (1945) was in fine fruit, and we again wondered at the relative bigness and crowding of the spikelets of the Virginian representative of *Rhynchospora perplexa*. When we came to a diving-board, ranks of seats in the

woods, summer-cottages and evident meeting-places we turned back but another day returned to follow the beach toward the north. The little settlement proved to be a gathering-place for Boy Scouts of the state, presented and maintained by the liberal former Governor Darden. Stating our errand to the warden, we proceeded to follow up other nice plants, only three of which will here be noted. Among the ordinary broad-leaved *Cephalanthus occidentalis* of boggy thickets there were clumps with very narrow "willowy" leaves, this extreme form to be accounted for in Part II. We had been having a repetition of Moore's and my experience with *Fraxinus caroliniana*, which here showed uncanny variation in its fruit, but the tree which really delighted us was a large evergreen or semi-evergreen oak with great rounded and dense crown and drooping fruiting branchlets, which was scattered back of the beach through the woods. This was clearly the Darlington Oak, *Quercus hemisphaerica* Bartr. ex Willd., discussed and illustrated by me in RHODORA, xlviii. 137 et seq., pl. 1035 and 1036 (1946). Our previous collections had been from small trees in the gum-swamp along West Neck Creek west of Pungo in Princess Anne. Here at Darden Pond the trees are very handsome and fully grown. Returning to the car, we stopped to investigate a strange-looking *Physalis* in the sandy woods. It was not merely strange-looking; it was really so strange that it will be discussed and illustrated (PLATES 1080 and 1081, figs. 4 and 5) in Part II.

Thus we have again demonstrated that, in spite of almost complete clearing, settling and cultivating of many areas of southeastern Virginia, there is plenty yet to do for the botanist who knows what to avoid as ordinary, what to collect as unusual. Almost every wholly natural and unmolested spot has its isolated specialties. The great problem is to locate these spots, often so small in area as to be insignificant on a map or an aerial photograph. Only by learning the more conspicuous "indicators" and promptly following up their indications (before the plow or bulldozer gets there) can we find the last remnants of what originally must have been the most varied and numerically the largest indigenous flora in the Manual-area. Many species, found by early botanists, are apparently gone but many others, not seen by them, still linger. These we want to know about before Man has destroyed them.

PART II. RANGE-EXTENSIONS, RANGE-ABBREVIATIONS,
TECHNICAL NOTES AND DESCRIPTIONS

In Part II, as in previous papers of this Virginia series, I have assembled in taxonomic sequence and often with fuller discussion the principal records of range-extensions and descriptions of novelties which are noted in the diffuse narrative, as well as others not there noted. Several revisions of groups, growing partly out of the Virginia work, are noted, and, in order to assemble the Virginian specialties, several species and varieties already published elsewhere are here drawn in and in many cases indicated as additions to the flora of the state, the original collections justifying their being noted here. Several others, the status of which in Virginia has long been questionable, are also discussed, an attempt having been made to trace the sources of such records. Most of the plates, some of them of highly inartistic subjects, were prepared with her accustomed skill by Dr. BERNICE G. SCHUBERT before her departure to Europe to study and photograph hundreds of types. Most unfortunately I must humbly apologize to her for failing completely to remove some films of the almost (but not quite) transparent adhesive over numbers or other points in a few plates, these having been left with me to clean finally before they went to the engraver. Five plates, more recently made, are the work of my student, IAN D. CLEMENT, our companion on the last September trip. The cost of the engravers' blocks has been met through an appropriation for personal research from the DEPARTMENT OF BIOLOGY OF HARVARD UNIVERSITY. For meeting the expense of their reproduction I am again indebted to my always alert companion on many botanical explorations for more than thirty years, Mr. BAYARD LONG. Plants thought to have been previously (except in the cases above noted) unrecorded from Virginia are indicated by an asterisk (*).

**DRYOPTERIS THELYPTERIS* (L.) Gray, var. *PUBESCENS* (Lawson) A. R. Prince, forma *SUAVEOLENS* (Clute) A. R. Prince. PRINCESS ANNE COUNTY: fresh tidal reed-marsh along Blackwater Creek ("River" of contour sheet), below Blackwater, *Fernald & Long*, no. 14,870.

Very tall (up to 1.05 m.) and, in September at least, scenting the marsh with a strong coumarin-odor, suggestive of "Hay-

scented Fern". The odor not evident in the specimens after the lapse of a year.

D. GOLDIANA (Hook.) Gray. SURRY COUNTY: lower slopes of rich calcareous wooded gullies along James River, Claremont Wharf, *Fernald & Long*, no. 8006, *Smith & Hodgdon* in Pl. Exsicc. Gray., no. 1003; rich wooded gullies along James River, below Sunken Meadow Beach, *F. & L.*, no. 8007; very abundant in rich deciduous woods $1\frac{1}{2}$ miles east of Blizzard's Corner, *F. & L.*, no. 9235.

Through my failure to understand the rather definite characters which separate *Dryopteris celsa* (W. Palmer) Small, of inundated acid swamps, cypress-swamps, cypress-knees and -logs and wet woods of the southeastern Coastal Plain, from the really different *D. Goldiana* of rich (mostly calcareous) woods, chiefly northward and inland, the numbers above cited were erroneously distributed or reported as *D. celsa*. Briefly stated, the distinctions which I propose to publish in the Manual (if the rights to copyright are not endangered by someone else copying this item and himself copyrighting it first—such things happen) between *D. celsa*, *D. cristata* (L.) Gray, var. *Clintoniana* (D. C. Eaton) Underw., *D. Filix-mas* (L.) Schott (which comes down nearly to meet *D. Goldiana* in the North) and *D. Goldiana*, follow.

- a. Lowest pinnae of fertile fronds with 10–22 pairs of definite pinnules (excluding terminal teeth or small lobes); blades lanceolate to lance-oblong, the fertile ones one fifth to half as broad as long; basal scales of stipe pale brown to fuscous, thin and scarious. . . . b.
- b. Lowest pinnae obviously shorter than median ones; scales of stipe pale brown to cinnamon.
Basal scales of stipe ovate to ovate-lanceolate, 1–2 cm. long; lowest pinnae deltoid-ovate, the others broadly lanceolate; plant of swamp or wet woods, north to southern Canada. . . . *D. cristata*, var. *Clintoniana*.
- Basal scales of stipe lance-linear and long-attenuate, 1.5–3 cm. long, mixed with shorter setiform ones; lowest pinnae lance-ovate or lanceolate, the others lance-linear; boreal upland plant. . . . *D. Filix-mas*.
- b. Lowest pinnae nearly or quite as long as and like the median ones, all lanceolate; basal scales of stipe brown to fuscous, lance-attenuate to oblong-ovate, 0.7–1.5 cm. long; southeastern paludal species. . . . *D. celsa*.
- a. Lowest pinnae of fertile frond with (15–) 20–31 pairs of definite pinnules; blades ovate to ovate-oblong, one half to five sixths as broad as long; basal scales of stipe firm, castaneous to blackish, lustrous; plant of rich temperate woodland. . . . *D. Goldiana*.

Dryopteris Goldiana in the calcareous ravines of the lower

James thus takes its place with other upland and inland calcicolous species of the same region.

*LYCOPODIUM COMPLANATUM L., var. FLABELLIFORME Fernald, forma **brachypodium**, f. nov., a forma typica recedit pedunculo 0.5–1.5 cm. longo.—Sussex County, VIRGINIA: forming a broad carpet on the sandy wooded terrace of Nottoway River, 3 miles north-northwest of Bethel Church, September 9, 1946, *Fernald, Long & Clement*, no. 15,171.

Forma *brachypodium*, which forms a large mat where we found it, was only sparsely fruiting. It strongly contrasts with the usual and typical var. *flabelliforme* in having the common peduncle so short as to appear, without close examination, to be wanting, the peduncle in var. *flabelliforme* usually being very evident, 3–11 cm. long.

POTAMOGETON DIVERSIFOLIUS Raf. When I treated this species in Mem. Am. Acad. xvii, pt. 1, 105–108 (1932) I had seen it from only one station in southeastern Virginia, that in Princess Anne County. It proves to be generally distributed from Northampton and Princess Anne Counties inland to Henrico, Dinwiddie and Greensville Counties.

NAJAS IN THE VIRGINIAN ESTUARIES.—In RHODORA, xliii. 527 (1941) I wrote, in discussing some of the estuarine plants of southeastern Virginia: "As if it were not enough, for an estuary already 'worked out', *Najas* at low tide began to upset our calculations. The material secured belongs to three species. Before they can be satisfactorily settled additional collections, especially at a later season, must be secured." More material has been collected but I find myself still puzzled as to exact identities. I have tentatively placed them in the three generally recognized eastern species, but close study by one more familiar with the technical characters is likely to lead to readjustment.

*?NAJAS FLEXILIS (Willd.) Rostk. Plants temporarily so identified are from two river-systems. KING WILLIAM COUNTY: fresh tidal margin of Mattaponi River, northwest of King William Courthouse, *Fernald & Long*, no. 12,520. NEW KENT COUNTY: fresh tidal marsh by Chickahominy River at "Shady Rest", southeast of Windsor Shades (Boulevard Post Office), *Fernald & Long*, no. 12,523. CHARLES CITY COUNTY: fresh tidal margin of Chickahominy River, near Cypress Bank Landing, *F. & L.*, no. 13,214.

On a sheet of no. 12,520 Dr. R. T. Clausen has noted departures from typical *Najas flexilis* in length of style, slenderness of fruits, etc. To these should be added fleshier and firmer leaves. I leave the problem to Clausen, who has done clarifying work on the genus.

N. GUADALUPENSIS (Spreng.) Morong. To the published records add the following. KING WILLIAM COUNTY: fresh tidal shore of Mattaponi River at Horse Landing, near King William Courthouse, *Fernald & Long*, no. 11,510; similar habitat northwest of King William Courthouse, no. 12,522. PRINCESS ANNE COUNTY: shallow pools in brackish to fresh marsh along Back Bay east of Creeds, *Fernald & Long*, no. 10,871; shallow pool in brackish to fresh marsh along Back Bay, at eastern margin of Long Island, *F. & L.*, no. 10,478; fresh to brackish water over sandy bottom, Back Bay, Long Island (extreme depth of water about 4 feet), *F. & L.*, no. 10,872.

?*N. GRACILLIMA* (A. Br.) Morong. KING WILLIAM COUNTY: fresh tidal margin of Mattaponi River, northwest of King William Courthouse, *Fernald & Long*, no. 12,521. NEW KENT COUNTY: fresh tidal marsh by Chickahominy River, Walker, *F. & L.*, no. 13,511; fresh tidal marsh by Lacy Creek, west of Walker, *F. & L.*, no. 13,510. CHARLES CITY COUNTY: fresh tidal margin of Chickahominy River near Cypress Bank Landing, *F. & L.*, no. 13,213, and at Graves Landing, north of Holdercroft, no. 13,512.

The material from tidal flats in eastern Virginia and from along the Delaware seems to differ from true *N. gracillima* of fresh sandy or peaty pools in different texture and, perhaps, shoulders of the stipular sheaths. Again I commend the problem to Dr. Clausen.

**SAGITTARIA planipes*, sp. nov. (TAB. 1056, FIG. 1-6), a *S. latifolia* differt bracteis planis nec cucullatis vel navicularibus; pedicellis compressis planis; antheris ovatis 1-1.3 mm. longis.—Norfolk County, VIRGINIA: deep peat and mud, southeastern shore of Lake Drummond, Great Dismal Swamp, west of Wallace-ton, September 15, 1941, *Fernald & Long*, no. 13,517 (TYPE in Herb. Gray.).

Sagittaria planipes superficially suggests *S. latifolia* Willd., var. *obtusata* (Muhl.)^{*} Wiegand, having very similar leaves and achenes. Its flowering tufts, however, terminate very long and deeply buried slender caudices without evident bulbous enlargement. The bracts subtending the pedicels are flat (FIG. 2), instead of cucullate or boat-shaped (FIG. 7); the pedicels strongly

flattened (FIGS. 3 and 4), instead of terete, very strongly ascending, the lower ones in maturity 2–5 cm. long, the pedicels of *S. latifolia* and var. *obtusa* usually more spreading or spreading-ascending, terete, and the lower ones rarely so prolonged. The anthers of *S. planipes* (FIG. 5) are ovate or ovate-quadrate and only 1–1.3 mm. long, the nearly linear anthers (FIG. 8) of *S. latifolia*, var. *obtusa* being 1.5–2.3 mm. long. Differing in its bracts, pedicels and anthers, *S. planipes* is apparently a distinct species, although further material may prove it to be a strong variety of *S. latifolia*.

The collection consists of one fairly respectable specimen (FIG. 1) and a second badly eaten individual, not the kind of representation of a plant the collectors aim to secure. The material was got under rather strenuous conditions which I described in RHODORA, xliv. 365 (1942):

Lake Drummond was so phenomenally low that it had been difficult to navigate, on account of drowned cypress-knees, and it was, consequently, necessary to anchor hundreds of yards from the thicket and to wade, often slipping on submerged logs, to shore. At one point on the southeastern side, where we saw a vivid green carpet of low vegetation, Long and I struggled ashore, guiding ourselves by means of oars as sounding-rods and sinking each step well above our knees into the plastic clay of the bottom. Even after we got to the green carpet the clay, above low-water level, was so pasty and deep that we wallowed and tumbled with great ease but kept enough poise and breath to collect only with extreme difficulty. Pulling and grabbing as best we could we brought to the boat a miscellany of specimens and, after it was too late, we discovered that the *Sagittaria* of this deep mud had peculiar bracts and strongly compressed pedicels; furthermore it evidently has prolonged subterranean rhizomes. The material is rather inadequate and we needed more conclusive specimens. Unfortunately, however, when, in October, we tried to get to Lake Drummond for it, the Feeder was closed to navigation on account of repairs going on. The *Sagittaria* is one of many problems left for the future.

The war-years making Lake Drummond inaccessible to us, I now venture to describe the strange *Sagittaria*, hoping another season to secure fuller and better material.

THE IDENTITY OF THE LINNAEAN ALISMA CORDIFOLIA.—

ECHINODORUS CORDIFOLIUS (L.) Griseb. in Goett. Abh. vii. 257—repr. 109 (1857), at least as to basonym, *Alisma cordifolia* L. Sp. Pl. 343 (1753). *Sagittaria radicans* Nutt. in Trans. Am. Phil. Soc. v. 159 (1837). *E. radicans* (Nutt.) Engelm. in Gray, Man. 460 (1848) and ed. 2: 438 (1856).

It is astounding that the species, *Echinodorus cordifolius*, based directly on *Alisma cordifolia* L. Sp. Pl. (1753) "*Habitat in Virginia*" and with Morison's very characteristic figure cited by Linnaeus "*Sagittaria virginiana, obtusiore lato folio, floribus albis. Moris. hist. 3. p. 618. s. 15. t. 4. f. 6*", should have been generally treated as a South American species unlike that of Virginia, or, more recently, as being the much smaller *E. rostratus* (Nutt.) Engelm., the latter based on the small and erect *Alisma rostrata* Nutt., l. c. of the Mississippi drainage, thence westward and southwestward. The plant of southeastern Virginia, along the James, Blackwater and Nottoway Rivers, is exactly *E. radicans*, that species extending up the Coastal Plain from Florida, across eastern South and North Carolina. Morison's figure of his *Sagittaria virginiana* is quite characteristic and the type in the Linnaean Herbarium shows portions of two inflorescences, one just out of anthesis, the other in fruit, either of which could have come from the bottomlands of the James or the Nottoway. The microfilm of the type and the enlargement of it in the file at the Arnold Arboretum is unquestionable. It is no longer right to follow those authors who insist that the plant of Virginia really came from South America or is *E. rostratus* of the Mississippi drainage and westward. When Nuttall described the latter, as *Alisma rostrata*, he said "Nearly allied, apparently, to *A. cordifolia* of South America". "How do they get that way?" The original account by Linnaeus was, seemingly, of no importance.¹

**DACTYLIS GLOMERATA* L., var. *DETONSA* Fries. NORFOLK COUNTY: very abundant on roadsides and in damp old clearings and thickets, north of Wallaceton, *Fernald & Moore*, no. 15,030.

**D. GLOMERATA* L., var. *MULTIFLORA* G. Beck. GREENSVILLE COUNTY: soft shoulder of road north of Skipper's, *Fernald*, no. 14,773.

TRIPLASIS PURPUREA (Walt.) Chapm. In Gray's Manual, ed. 7, Hitchcock states the height or length of the culms as 3-8 dm.,

¹ With the name *Echinodorus cordifolius* returned to the species described by Linnaeus, the following transfer becomes necessary:

E. ROSTRATUS (Nutt.) Engelm., forma *lanceolatus* (Engelm.), comb. nov. *E. rostratus*, var. *lanceolatus* Engelm. ex. Wats. & Coult. in Gray, Man. ed. 6: 556 (1891). *E. cordifolius*, var. *lanceolatus* (Engelm.) Mackenz. & Bush, Man. Fl. Jackson Co., Mo. 10 (1902). *E. cordifolius*, forma *lanceolatus* (Engelm.) Fernald in RHODORA, xxxviii. 73 (1936).

in his Manual of Grasses as "30 to 75 cm.". On the coast of New England the culms may stop at a height of 1 dm.; among the dunes of Chesapeake Beach, Princess Anne County, Virginia (*Fernald, Long & Clement*, no. 15,174), they reach a height of 1.2 m. See p. 101.

AGROSTIS SCABRA Willd. ISLE OF WIGHT COUNTY: large stools in a moist sandy and peaty clearing south of Lee's Mill, *Fernald & Moore*, no. 15,032.

Our first evidence of the relatively northern *Agrostis scabra* in a region where the much smaller and earlier *A. hyemalis* (Walt.) BSP. abounds. See Fernald in RHODORA, xxxv. 207, 208, pl. 246 (1933).

THE IDENTITY OF CORNUCOPIAE ALTISSIMA.—

AGROSTIS ALTISSIMA (Walt.) Tuckerm. in Am. Journ. Sci. xlv. 44 (1843), excl. var. *Cornucopiae altissima* Walt. Fl. Carol. 74 (1788). *Trichodium elatum* Pursh, Fl. Am. Sept. i. 61 (1814). *A. elata* (Pursh) Trin. Mém. Acad. St. Pétersb. ser. VI. Sci. Nat. iv. 317—repr. 71 (1841). *Trichodium altissimum* (Walt.) Michx. ex Wood, Class-bk. ed. 2: 599 (1847). *A. perennans elata* (Pursh) Hitchc. U. S. Dept. Agr., Bur. Pl. Indus. Bull. no. 68: 50, pl. xxxiii. (1905). *A. hyemalis*, var. *elata* (Pursh) Fernald in RHODORA, xxiii. 229 (1921). *A. perennans*, var. *elata* (Pursh) Hitchc. Man. Grasses U. S. 340, 784 (1935).

Since Pursh's original account of his *Trichodium elatum* cited as pure synonyms the earlier *Cornucopiae altissima* Walt. (Pursh liking another name which had the same meaning) and *Agrostis dispar* Michx., the name *Trichodium elatum* was illegitimate on two counts, for Pursh failed to take up either of the earlier names of plants which he considered identical with his. Hitchcock, in U. S. Dept. Agr., Bur. Pl. Indus. Bull. no. 68: 50 (1905), quoting Walter's brief diagnosis, "culmo erecto, duro; panícula coarctata; flor. magnis [as compared with those of *C. perennans* immediately preceding]", wrote as follows:

"This description is scarcely sufficient to identify the species, which is not represented in Walter's herbarium. The plant which I have referred to *A. elata* is quite rare and there are few specimens from the Carolinas, the region covered by Walter's Flora, and it certainly is not common. There does not seem sufficient evidence for taking up Walter's name, nor is it likely to be any better known in the future. The name is inserted here [among synonyms] because later authors have assumed that this was *Trichodium elatum* Pursh. It is more likely to have been *Agrostis alba* L."

Of that more below. Of *Trichodium elatum* Hitchcock wrote: "The type specimen, or at least one collected by Pursh, is in the herbarium at Kew"; while regarding *Agrostis elata* (Pursh) Trin., which Trinius had based nomenclaturally directly on "*Trichodium elatum Pursh Fl. Amer. I, p. 61*", Hitchcock (by some thought to understand the principles of plant-nomenclature) said "The type specimen is in the Trinius herbarium at St. Petersburg. There are two plants mounted on the sheet, one from pine barrens of New Jersey, collected by Doctor Torrey and sent by Greville, 1835. The other, also from New Jersey ('Nov. Caesar. '), sent by Doctor Gray, 1835. The second would be the type as it is the one first mentioned by Trinius . . . Both specimens agree with Pursh's type. It may be best to consider this primarily a change of name [it certainly was a transfer from one generic name to another!], in which case the type is Pursh's plant." Obviously, it would seem, when Trinius cited the Pursh name as the nomenclatural basis of *Agrostis elata* he did not change the type!

Now as to *Agrostis altissima* (Walt.) Tuckerm. Tuckerman based his specific epithet on that of Walter, although he, like Pursh and others, added to the synonymy *Agrostis dispar* Michx., which Hitchcock has said was merely *A. alba* L. Furthermore, Tuckerman, citing Carolina and New Jersey specimens, gave a clear description of the Coastal Plain species with "culmis erectis duris rigidis crassiusculis, foliis . . . scaberrimis . . . , panicula coarctata ramis verticillatis erectis rigidiusculis scabris summitatibus dense floridis, glumis magnis", etc., this description ampler but containing the points given by Walter, "culmo erecto, duro; panicula coarctata; flor. magnis", a diagnosis of which Tuckerman wrote: "The description of Walter can hardly be improved as respects the prominent features of this very distinct species", although Hitchcock, never having handled fresh material (as shown by his citation of specimens) found it "scarcely sufficient to identify the species". Having many times collected and studied in the field both of Walter's species, *Cornucopiae perennans* and *C. altissima*, I concur in Tuckerman's characterization of the brief but clear diagnosis.

It should be noted that, on his page 74, Walter had two new species: first *Cornucopiae perennans*, "culmis subdecumbentibus;

foliis latioribus; panícula longa diffusa, ramis trichotomis verticillatis". He added further notes, of which certain ones are significant, for instance his "Gramen undique laeve, . . . in hyeme vigens, radicibus geniculisque se cito propagans". Then followed *C. altissima*, with erect, hard culms, crowded panicle but large spikelets. Now, when one compares the two species, *Agrostis perennans* and *A. altissima* (*A. elata*), as they abound in southeastern Virginia (to say nothing of the Carolinas, except that there is an old sheet of Ravenel's from "damp pineland", Santee Canal, September, in the Gray Herbarium—this from close to Walter's home, Walter's classical volume with the preface signed from "Ripas Fluvii Santee, 30 Dec. 1787")—when the two are compared it is notable that the latter, a plant of bogs, wet pinelands and clearings or margins of pools, is upright, with hard and stiff culms, usually without any new green basal offshoots in late autumn, the cauline leaves 5–10, with overlapping scabrous sheaths and stiff, erect narrowly linear to involute harsh blades 0.6–2 dm. long, their ligules 4–5 mm. long; the narrowly ovoid to lanceolate panicle with few ascending and strongly scabrous branches forking above the middle into appressed, short floriferous branchlets; spikelets purplish or bronze, 2.5–3.8 mm. long, with slightly unequal lance-attenuate glumes, the lemma 2.3–3 mm. long.

On the other hand, *Agrostis perennans* of woods, thickets and clearings (not of bogs and wet pineland) has softer culms and, as Walter clearly stated, sends out in autumn green, overwintering basal leafy tufts. Its 3–7 loosely ascending to divergent cauline leaves are flexible, flat and only slightly scabrous or smooth ("Gramen undique laeve"—Walter), their ligules 2.5–5 mm. long; the loosely ascending to wide-spreading branches of the panicle smooth or barely scabrous; the usually green spikelets 2–(rarely) 3 mm. long, the lemma 1.5–2 mm. long. These differences in the spikelets were clearly seen by "The artist", unnamed by the author of the text but from the signature "A. C." on the plates fortunately apparent, in Hitchc. l. c. plates xxxi–xxxiii, but their significance seems not to have been appreciated. The plates are, indeed, very fine and fully justify Hitchcock's characterization (p. 14): "The artist has faithfully reproduced all the technical details of the spikelets". Since she clearly showed the

spikelets of *A. perennans*, var. *elata* as 3.8 mm. long, it is too bad that this accurate measurement was not recorded in the text (or in the later Manual of Grasses), where the maximum length for the inclusive species is given as 3 mm.

Further indicating Hitchcock's failure to understand *Agrostis altissima* (*A. elata*) are the facts that, in the synonymy of his misunderstood *A. perennans*, var. *elata*, Hitchcock (Man. of Grasses U. S. 784, 785 (1935)) places *A. perennans* forma *chaetophora* Fernald in RHODORA, xxxv. 317 (1933), the type from Huntingdon (not "Huntington"—*Hitchc.*) County, Pennsylvania, 150 miles inland from the Pine Barrens of New Jersey where *A. perennans*, var. *elata* (i. e. *A. altissima*) really occurs, Huntingdon County being among the Allegheny Mountains and the type being perfectly ordinary *A. perennans* but with awned lemmas; and *A. perennans*, var. *aestivalis*, forma *atherophora* Fernald, l. c., the type from Co. Terrebonne, Quebec (not simply "Terrebonne, Quebec"—*Hitchc.*, the locality in Co. Terrebonne being Lac Tremblant), 325 miles north of the northern limit of Hitchcock's *A. perennans*, var. *elata* on the Coastal Plain of southeastern Massachusetts, forma *atherophora* being characteristic *A. perennans* var. *aestivalis* with 4 remote smoothish and flat cauline leaves, very diffuse panicle and spikelets 2 mm. long but with the lemma awned. Its collector had originally called it *A. canina*, a natural error since he used Gray's *Manual*, in which Hitchcock's key read as follows:

- "Lemma awnless.....4. *A. perennans*.
 Lemma awned.
 Spikelets 2 mm. long.....5. *A. canina*.
 Spikelets 3 mm. long.....6. *A. borealis*."

Nevertheless, in his Manual, Hitchcock did not place either *A. canina* or *A. borealis* in the synonymy of his vaguely understood *A. perennans*, although forms of them both (usually with awns) are well known with awnless lemmas. The same inconstant "Lemma awned" as opposed to "Lemma awnless" is there repeated by the author of a detailed monograph of the genus in North America!¹

The upshot of this discussion is, that, since the secondarily

¹ Another awned form is

AGROSTIS ALBA L., forma *aristata* (Fernald), comb. nov. *A. stolonifera*, forma *aristata* Fernald in RHODORA, xxxv. 317 (1933).

basic name *Trichodium elatum* Pursh was illegitimate, it might be necessary further to confuse matters by giving it a new and legitimate name. Since, however, the original basic *Cornucopiae altissima*, briefly defined by Walter to contrast with his preceding *C. hyemalis* and *C. perennans*, was assigned characters, "culmo erecto, duro; panicula coarctata; flor. magnis", in contrast with those of the other two, Walter's characterization was, as Tuckerman found it, almost vividly accurate. I see no reason, from rather close familiarity with such a Coastal Plain species, why we should not maintain for it the name *Agrostis altissima* (Walt.) Tuckerm. If it be true that no specimen (type) of Walter's own collection now exists, then, since Pursh merely renamed and redescribed it under a substitute name, we may accept as the lectotype the Pursh specimen preserved at Kew.

THE TWO VARIETIES OF SPARTINA CYNOSUROIDES.—In coast-wise Virginia as well as northward and southward *Spartina cynosuroides* (L.) Roth occurs as two usually well defined ecological varieties. One, typical *S. cynosuroides*, is primarily a plant of fresh to but slightly brackish tidal estuaries, the other, which was described by Michaux as *Trachynotia polystachya*, is confined to saline shores and salt marshes. The two are distinguished as follows:

S. CYNOSUROIDES (L.) Roth, Catal. Bot. iii. 10 (1806). *Dactylis cynosuroides* L. Sp. Pl. 71 (1753), clearly described "*Spicae sex s. plurimae, secundae, divergentes*", the type (photograph before me) from Gronovius (*Clayton*, no. 577). The plant, with 6 or more divergent spikes is, in light of more adequate material, characterized by its inflorescence of 6–50 spikes in an open raceme, these subdistant or distant, often definitely peduncled. It follows mostly fresh tidal shores northward to Connecticut. In southeastern Virginia it extends up-river far above the areas of salt marsh, up the James at least to Gray's Creek in Surry County. See p. 90.

Var. POLYSTACHYA (Michx.) Beal, Grasses N. Am. ii. 398 (1896). *Trachynotia polystachya* Michx. Fl. Bor.-Am. i. 64 (1803), described with "*spicis numerosis inordinatis, passim subaggregatis . . . in inundatis maritimis, a Nova Anglia ad Floridam*". This Beal took to be the strictly maritime plant which is characterized by the dense or soon dense inflorescence with the 30–100

or more appressed-ascending or erectish spikes only short-peduncled to subsessile. It extends northward in saline marshes to Cape Cod. We have not seen it on the estuaries of Virginia. Mr. Long informs me that in New Jersey, Delaware and eastern Pennsylvania the two varieties are similarly selective of habitat.

SPARTINA PATENS (Ait.) Muhl., var. **monogyna** (M. A. Curtis), comb. nov. *Limnetis juncea*, var. *monogyna* M. A. Curtis in Bost. Journ. Nat. Hist. i. 136 (1835). *Trachynotia juncea* Michx. Fl. Bor.-Am. i. 64 (1803). *Limnetis juncea* (Michx.) L. C. Richard in Pers. Synop. i. 72 (1805). *S. juncea* (Michx.) Willd. Enum. 81 (1809). *S. patens*, var. *juncea* (Michx.) Hitchc. in RHODORA, viii. 210 (1906).

Spartina patens, based on *Dactylis patens* Ait. (1789), has two wide-ranging varieties, each extending many hundreds of miles beyond the limits of the other; but from southern New Hampshire to Virginia with ranges, but very rarely habitats, overlapping. The northern variety, true *S. patens*, follows saline or brackish marshes and inundated shores from Newfoundland around the Gulf of St. Lawrence and up the River St. Lawrence to the limit of saline marshes, thence southward around the coast to marshes of Lynnhaven Bay in northern Princess Anne County, Virginia, with inland areas in western New York and southeastern Michigan; its northern limit more than 600 miles beyond the northern limit of the next. Var. *monogyna* (*S. patens*, var. *juncea*) is on saline shores or, more often, on coastal sands from southern New Hampshire to Florida, thence to Texas, its southwestern limit, following the coast, more than 2000 miles beyond the southern limit of typical *S. patens*. The two are not only geographically largely separated; morphologically they are strikingly different. Their distinctive characters are noted below:

Typical *S. PATENS*: rhizomes 1-3 mm. thick; culms 1-2.5 mm. thick at base, 1.5-8 dm. high or long; new green cauline leaves of the season usually 4 (2-5), the blade of the 2nd from the summit averaging 1 (0.5-2) dm. long; spikes 1-4, mostly purple; spikelets 9-13 mm. long, loosely imbricated, straightish, ascending, with suberect free tips; 2nd glume acuminate.

Var. *MONOGYNA* (var. *juncea* (Michx.) Hitchc.): mostly coarser; rhizomes 2-6 mm. thick; culms 1-6 mm. thick at base, 0.2-1.5 m. high; new green cauline leaves averaging 6 (5-9), the 2nd from summit averaging 2 (1-5) dm. long; spikes 2-9, purplish to stramineous; spikelets 7-10 mm. long, tightly imbricated and strongly arching, with appressed tips; 2nd glume often merely acute or even blunt.

Although in his Manual of Grasses of the United States Hitchcock merged the two rather striking and geographically only slightly overlapping varieties (as he did numerous others

which are well defined), in his treatment in Gray, Manual, ed. 7, in deference to some who clearly saw the distinctions, he had kept them apart.¹

M. A. Curtis, evidently taking *Limnëtis juncea* to be true *S. patens*, described his new variety as follows:

“*Limnëtis juncea*, var. *monógyna*. Stem about 3 feet high; Leaves 8–12 inches long; Spikes 3–6, about their length distant from each other; Style 2-cleft like *L. cynosuróides*. In every other particular agreeing exactly with *L. juncea*. Grows abundantly on the sandy beach at the mouth of Cape Fear river. *L. juncea* has not been found there.”

The ISOTYPE of Curtis's variety in the Gray Herbarium, the label written by Curtis, is quite typical *Trachynotia juncea* Michx., concerning the identity of which I noted, when studying Michaux's type in 1903, “The sand-dune plant of Martha's Vineyard”. Curtis wrote beneath his new name “*S. juncea*, Ell.!” thus indicating, as suggested above, that he thought that true (not Elliott's) *Spartina juncea* was the smaller *S. patens* which “has not been found there [at mouth of Cape Fear River]”. The Curtis type or isotype is closely matched by such characteristic specimens as the following: sea-beaches, Cape May, New Jersey, August, 1872, *Canby*; *Fernald & Griscom*, no. 2711, *Fernald, Long & Fogg*, nos. 4793 and 5214, and *Fernald & Long*, no. 11,235, all from sandy coast or dunes of Virginia; *Ruth*, no. 537 from Fort Marion, North Carolina; *Biltmore Herb.*, no. 3516^a from sands of Smith's Island, North Carolina; *Godfrey*, no. 4651 from Carolina Beach, North Carolina; *Godfrey & Tryon*, no. 324 from dune-hollow, Pawley's Island, South Carolina; *Harper*, no. 1545 from drifting sands of Cumberland Island, Georgia.

(To be continued)

HELIANTHUS GROSSESERRATUS IN NEW ENGLAND.—Among the flowering plants not native to New England which have been spreading eastward from central United States is *Helianthus*

¹ While preparing the treatment of *Gramineae* for Gray, Man. ed. 7, Professor Hitchcock received a suggestion from one of the editors of that edition, that the wide-ranging species of the United States differed in many characters from the more northern and Eurasian *Glyceria fluitans*, with which it had been confused. Consequently he published as his new discovery *G. septentrionalis* Hitchcock in RHODORA, viii. 211 (1906), without noting the most important differential characters. While preparing the Manual of Grasses of the United States its author wrote to the botanist who had pointed out to him the distinctions of *G. septentrionalis*, asking how his own species differed from that of Linnaeus. In case of the smaller northern *Spartina patens* and its coarser and usually more southern variety the distinctions were apparently similarly lost.